

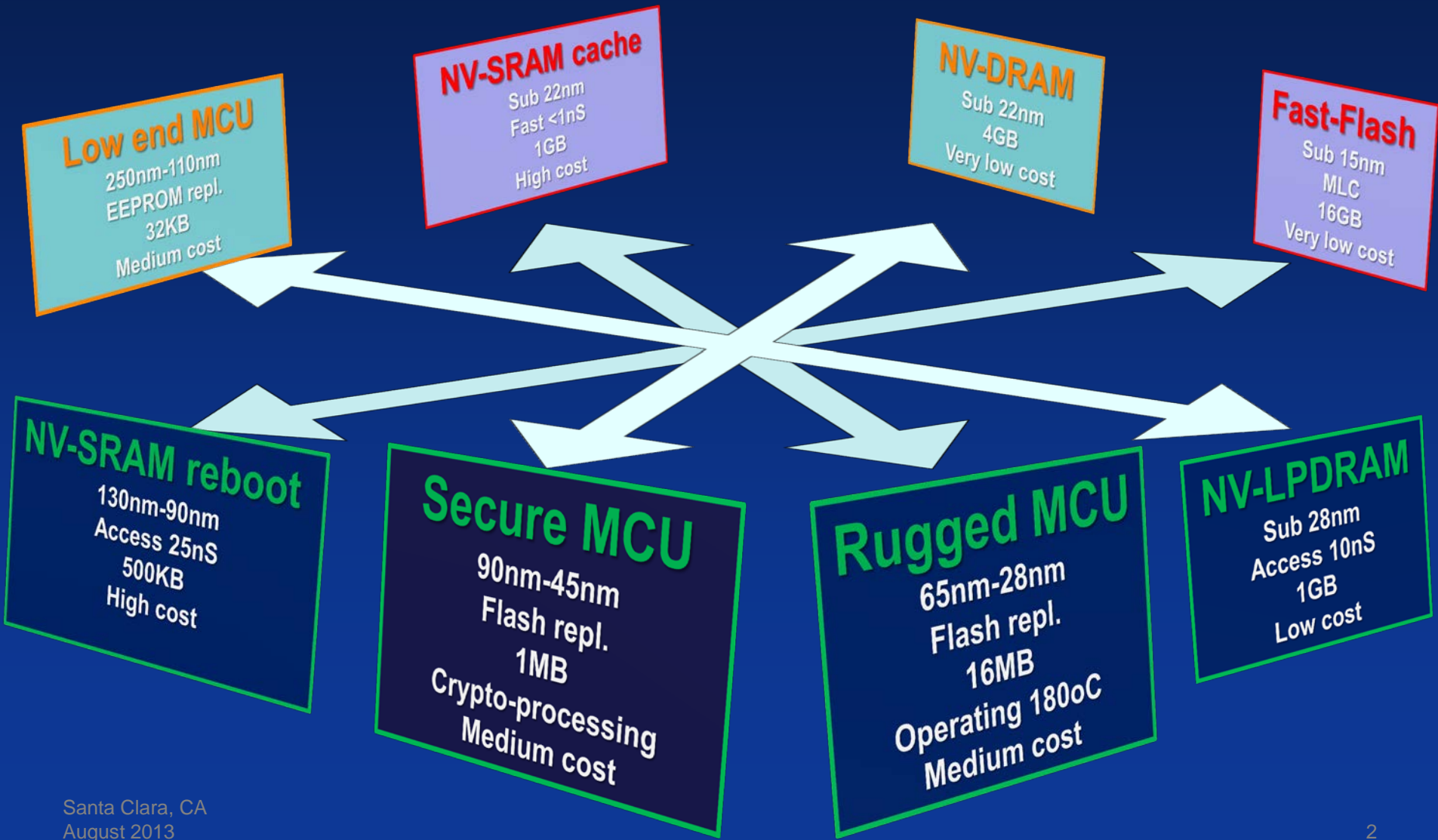


Secure Embedded MCU MLU Implementation

Bertrand Cambou

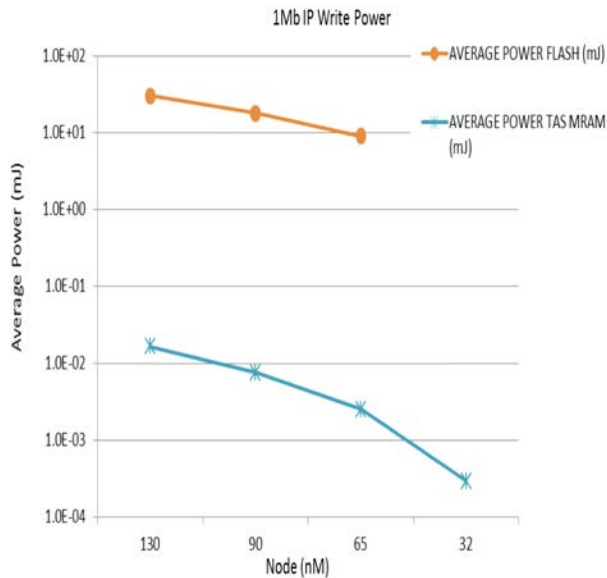
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Market opportunity for MRAM



MRAM vs. Flash

For Secure MCU

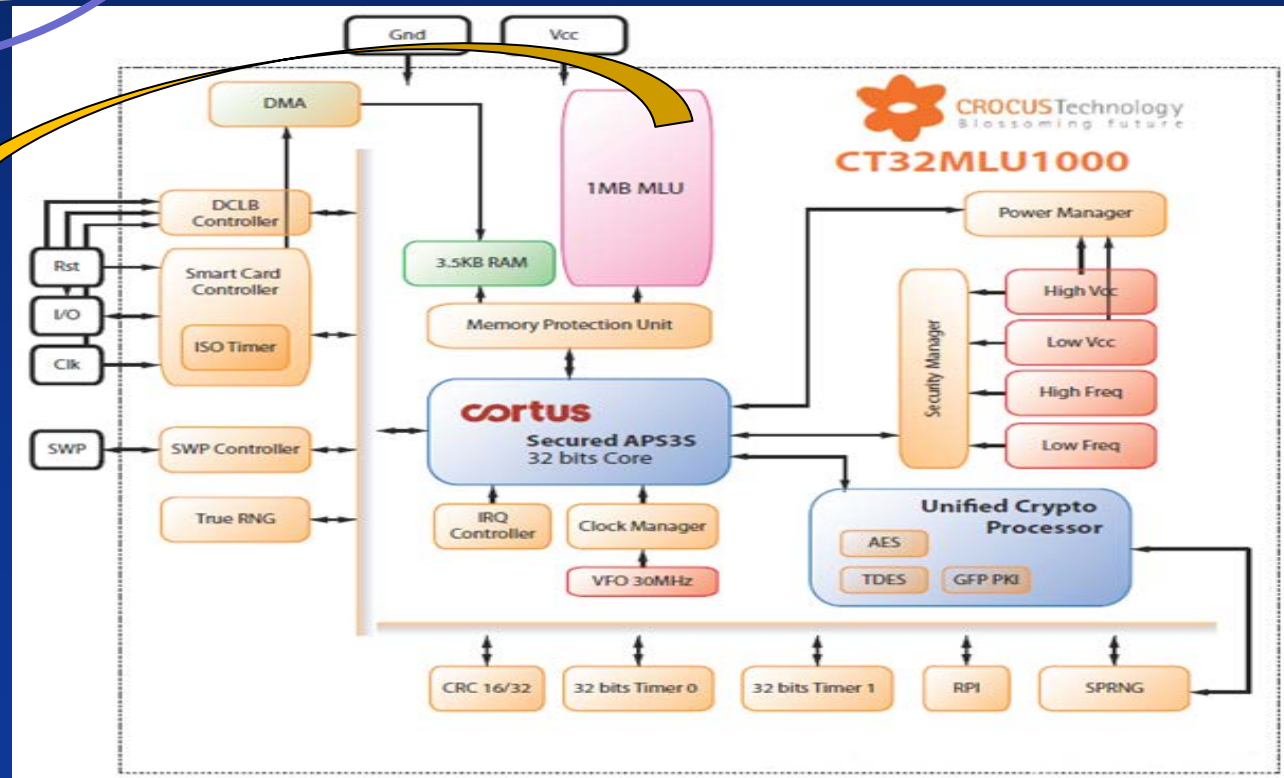
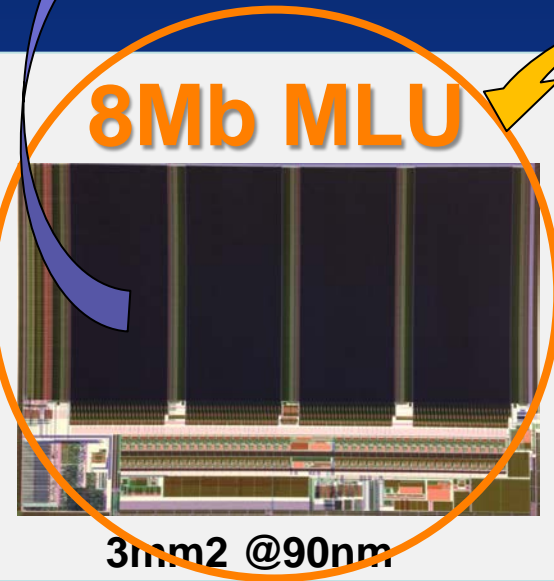
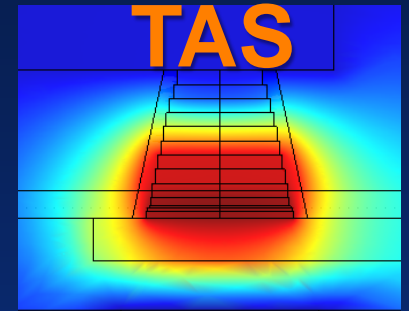
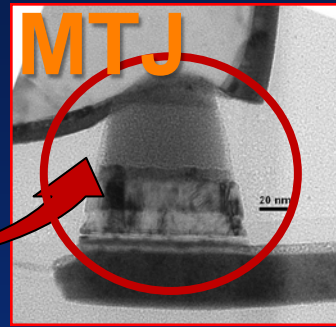
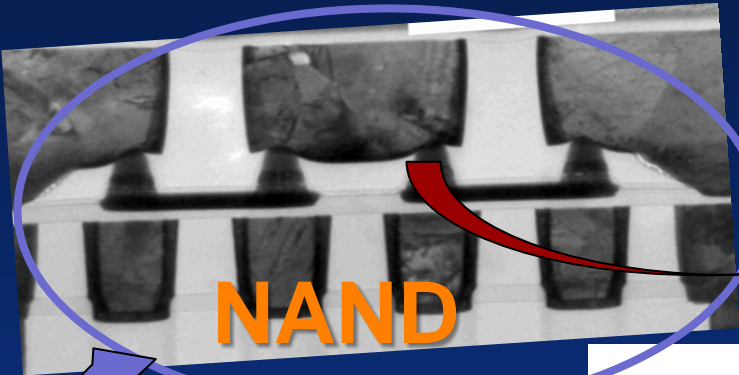


@65nm		eFlash	MLU
WRITE	Prog time (us)	5	<0.1
READ	Read time (ns)	50	<30
Cell Size	Per cell (um ²)	0.072	0.068
Block Size	32Mb (mm ²)	12	8
Mask layers	# of reticles	9	2
Test cost	P/E cycle μs	1000	0.1
Endurance	Cycles	400K	> 10**9

Secure applications:

- No electron trapping: Hard for hostile probing
- Constant current read: Tamper resistant (DPA)
- Match In Place authentication: Zero knowledge

MLU implementation



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